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Published in:
Energy Policy

DOI:
[10.1016/j.enpol.2016.09.055](https://doi.org/10.1016/j.enpol.2016.09.055)

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Document Version
Publisher's PDF, also known as Version of record

Publication date:
2016

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

McCarthy, K. J. (2016). On the influence of the European trade barrier on the CHinese pv industry: Is the solution to the solar-dispute "successful"? *Energy Policy*, 99, 154-157.
<https://doi.org/10.1016/j.enpol.2016.09.055>

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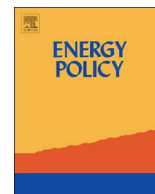
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On the influence of the European trade barrier on the chinese pv industry: Is the solution to the solar-dispute “successful”?



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ARTICLE INFO

Keywords:

Regulation
PV industry
European Union

ABSTRACT

In July 2013 the European Union (EU) imposed restrictions on Chinese solar photovoltaic (PV) manufacturers, looking to exporting to the EU. In this paper, we consider the impact of this trade barrier, using a sample of 454 stock-listed PV producing firms. We find that the trade barrier erased US\$ 8.19 million off the value of the average European PV manufacturers and US\$ 247.03 million off the value of the average Chinese PV manufacturers. We also find that while the trade barrier reduced the willingness of the industry to reorganise, it stimulates Chinese manufacturers to reorganise both their domestic and their international operations. The latter, we warn, is likely an attempt by Chinese manufacturers to ‘tariff jump’. We conclude, therefore, that the trade barrier was both inefficient, in that it both hurt the companies it aimed to protect, and ineffective, as those it sought to punish may have circumvented it.

1. Introduction

The Chinese solar photovoltaic (PV) industry has exploded in recent years. Chinese firms produced 3 MW (mega-watts) in 2000, and 10,852 MW in 2010 (Algieri et al., 2011), but between 2009 and 2014, the industry again quadrupled in size. In 2014, China accounted for 64% of global production, and the Chinese PV industry employed 1.6 million people.

The Chinese Government has played an important role in the growth of this industry. It has, for example, heavily invested in public R & D spending, but it also heavily subsidised Chinese PV manufacturers (Lacey, 2011).¹ The subsidies have had two effects. Firstly, it has enabled Chinese producers to survive where others would not; Haley and Haley (2013) report that the six biggest Chinese producers had debt ratios of over 80% in 2012, and conclude that without government support, all would have gone bankrupt. Secondly, the subsidy has enabled Chinese producers to produce cheaper products: Chinese products retail at €0.47/Wp (watt-peak), compared to the European average of €1.10/Wp.²

Recognising this, the European Union (EU) opened an antidumping investigation into the Chinese Government’s support for Chinese PV industry in November 2011, and concluded in July 2013 that the support was ‘unfair’.^{3,4} The EU responded by introducing trade

restrictions to protect European manufacturers. Since then Chinese firms exporting to Europe have been burdened with: (1) export restrictions, limiting total sales of Chinese PV to the EU of 7 gigawatts per year, (2) anti-subsidy (3.5–11.5%) and anti-dumping rates (27.3–64.9%); and (3) minimum prices of €0.56/Wp. This, the EU trade commissioner, suggested, would “stabilise the European solar panel market and remove the injury that the dumping practices caused to the European industry”.⁵

But how efficient and effective has that solution been? European producers have suggested that Chinese firms are dumping at a price about the level of the minimum price set by the EU, making them inefficient. And international business scholars suggest that firms, subjected to trade tariffs, can often simply reorganise their international operations to avoid them, in what is termed ‘tariff jumping’ (Motta, 1992; Belderbos, 1997; Blonigen, 2002) through, for example, international acquisitions (Neary, 2009).

In this paper, we consider the impact of the European response on the industry. We consider two questions. Firstly, we consider how the announcement of the trade barrier impacted the market value of Chinese and European PV manufactures. We do so using by considering changes in the firms market value. We expect that European firms – as the intended beneficiaries – will have reacted positively to the barrier, and Chinese firms – as the intended targets – will have reacted

¹ Most subsidies are indirect. In 2010, for example, the five largest Chinese producers received low-cost loans of USD 30 billion from the government sponsored Chinese Development Bank.

² ProSun (2016).

³ European Commission, 2013

⁴ The US opened an antidumping investigation in Sept 2012, and came to the same conclusion.

⁵ http://europa.eu/rapid/press-release_MEMO-13-729_en.htm

negatively. Secondly, we consider how the announcement impacted the behaviour of these firms. We do so by considering changes in acquisition-making behaviour. We expect that the industry as a whole will not have changed, but that Chinese firms will have sought to circumvent the trade barrier.

2. Methods

2.1. Sample

We build a sample of 454 stock-listed firms active in the PV industry in the period 1980–2015. The sample includes companies from 58 countries and, according to industry observers,⁶ it represents 11.2% of all firms active in the total PV industry. We identify PV firms, and the (1396) acquisitions that they made, using the *Thomson SDC*. We collect data on their share price, and market capitalisation, using *Datastream*⁷.

2.2. Estimating changing market value

We use a standard event-study methodology to estimate the effects of the trade barrier on the market value of the 454 firms in our sample (see e.g. MacKinlay, 1997; McWilliams & Siegel, 1997). We estimate the effect as follows. Firstly, we estimated the firms 'normal' performance using 250 days of historical (pre-announcement) stock market data. Using this, we forecast how the firm's stock should have behaved in the absence of the announcement. We term this the firms 'normal' return. Next, we collected data on how the firm actually performed in the period after the event. Comparing the firms expected, or 'normal' performance, with its 'actual' performance, leads to the creation of an expression referred to as the firms 'abnormal' returns. Finally, we sum the firm's abnormal returns over a period of 5 days post-announcement, and correct for wider changes in the stock market on which the firm is listed. Doing so, we create a measure of the firms 'cumulative abnormal returns' (CARs). These are the percentage gains/losses that the firm made, in the 5 days after the event, above/below the expectation of what the firm should have made, in the absence of the event. Therefore, the firm's CARs, multiplied by the firm's number of shares, provides an indication of the effect of the event on the firms market capitalisation, or value.

2.3. Estimating changing acquisition behaviour

We use standard ordinary least square regression analysis to estimate the impact of the announcement of the trade barrier on the acquisition behaviour of the industry. Specifically, we programme an indicator variable – *Trade Barrier* – which we set equal to 1 if the firm made an acquisition after the trade barrier and 0 otherwise, and then consider if this variable significantly impacted the acquisition trends within the sample.

3. Results

3.1. Changing trade patterns

Fig. 1 reports Chinese PV exports to the world, and Chinese exports to the EU, in the period 2000–2014.⁸ The vertical axis reports the value of the exports in billions of US\$. It reports that while Chinese exports grew throughout the period, exports to the EU dropped significantly

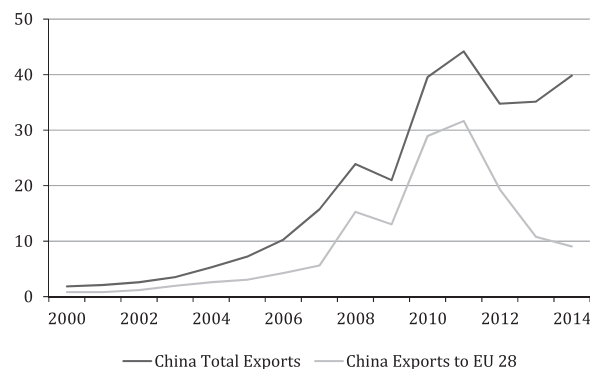


Fig. 1. Chinese PV Exports in Billions \$US.

Source: UNCTAD Comtrade database Methodology: Cao and Groba (2013), Steenblik (2005; 2006) and Wind (2008)

once the antidumping investigation started. Chinese exports to the EU dropped 46.5% in 2012, and by 60.8% in 2013, compared to 2011 levels. In other words, the imposition of the trade barrier, and indeed the two-year investigation that preceded its imposition, discouraged Chinese firms from exporting to the EU. We conclude, therefore, that the trade barrier significantly distorted the trade pattern.

3.2. Changing market value

Results of the event study report that the average firm in our sample lost 0.09% on the announcement of the trade barrier (Table 1). In dollar terms, and given the market capitalisation of the firms in our sample, this implies that the average firm lost USD 102 million, over a five day window, in reaction to the announcement of the trade barrier. For the average European firm, the loss was 0.08% (or USD 8.19 million per company, given an average market capitalisation of USD 9.5 billion). For the average Chinese firm the loss was 1.6% (USD 247.03 million per company, given an average market capitalisation of USD 15.4 billion). In total, we estimate that the firm in our sample lost USD 46.5 billion, European firms (n=231) lost USD 1.8 billion and Chinese firms (n=26) lost USD 6.4 billion. We conclude, therefore, that the impact of the trade barrier was a widespread destruction of firm value, with few apparent winners and many obvious losers.

3.3. Changing acquisition behaviour

Table 2 presents results on the effect of the trade barrier on the merger market. *Model 1* considers the impact of the trade barrier on the total number of acquisitions in the industry, controlling for year specific effects (Year). A negative coefficient suggests that fewer acquisitions were completed after the trade barrier than had been forecasted to occur in the absence of the barrier. *Model 2* considers the case of acquisitions by Chinese acquirers. The positive coefficient for the *Trade Barrier* variable in *Model 2* suggests that the *Trade Barrier* did have a positive and significant effect on the number of acquisitions involving Chinese firms. *Models 3* shows that the *Trade Barrier* had a positive and significant effect too on the number of outbound Chinese acquisitions. *Model 4* and *5* suggest that these conclusions remain robust control for the overall rise in acquisitions. From this we can

Table 1
The impact on firm value.

SAMPLE	N	Mean	St Dev	Average Loss in US\$	Total Loss in US\$
All	454	−0.0009	0.04327	102.47	4,6524.54
China	26	−0.01601	0.03881	247.18	6426.84
Europe	231	−0.00086	0.02692	8.19	1892.90

⁶ <http://www.enfsolar.com>

⁷ The firms market capitalisation – also known as market cap or market value – is estimated as the stock market price per share multiplied by the number of shares outstanding.

⁸ The UNCTAD database reports trade volumes for the 'EU-28', for the period 2000–2014.

Table 2
The impact on firm behaviour.

VARIABLES	(1) Total Number of Acquisitions	(2) Total Number of Chinese Acquisitions	(3) Total Number of Chinese Outbound Acquisitions	(4) Total Number of Chinese Acquisitions	(5) Total Number of Chinese Outbound Acquisitions
Trade Barrier	−23.45** (0.0324)	5.817** (0.0134)	1.555*** (0.000252)	9.555*** (1.29e−06)	2.110*** (1.37e−07)
Number of Acquisitions				0.159*** (4.34e−07)	0.0237*** (3.35e−05)
Year	2.584*** (3.67e−10)	0.212*** (0.00160)	0.00458 (0.665)	−0.200** (0.0140)	−0.0566*** (0.000666)
Constant	−5122*** (4.35e−10)	−422.3*** (0.00165)	−9.110 (0.666)	394.4** (0.0145)	112.1*** (0.000684)
Years	35	35	35	35	35
Adjusted R-squared	0.709	0.500	0.400	0.776	0.648

pval in parentheses

*p < 0.1.

*** p < 0.01.

** p < 0.05.

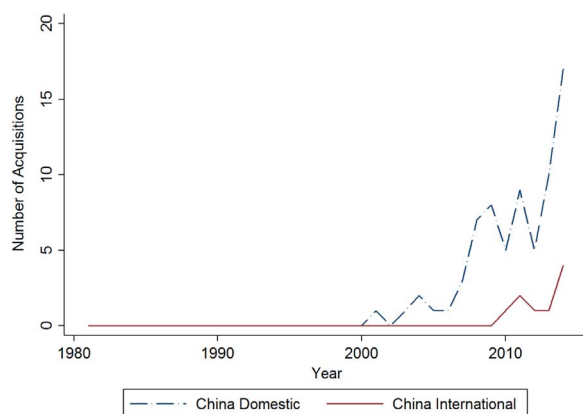


Fig. 2. Chinese PV acquisitions.

summarise and conclude that the *Trade Barrier* negatively impacted the wider market, and did not lead the average firm to reorganise, but it did lead Chinese firms to reorganise their operations both domestically and internationally. Fig. 2 documents that reorganisation. It describes both the total number of PV acquisitions involving Chinese acquires, and the number of cross-border Chinese PV acquisitions..

4. Discussion

4.1. Key findings

We find that while the trade barrier significantly impacted the industry, and distorted trade, it appears not to have had the impact that European regulators had hoped for.

Our results suggest, firstly, that the trade barrier led to a widespread destruction of value: the trade barrier wiped US\$ 8.19 million off the value of the average European solar-panel producing firm – possibly due to the fact that, at €0.56/Wp, the barrier did not offer European manufacturers sufficient protection – and erased US\$ 247.03 million off the value of the average Chinese producer – probably due to the extra cost that the barrier implied. Thus, the barrier hurt all manufacturers, albeit for different reasons.

Secondly, we report that fewer acquisitions, in general, were done after the introduction of the trade barrier than had been forecast. This may be linked to the widespread destruction in value implied by the barrier. We observe, however, that Chinese acquirers were the exception to that rule, in that Chinese firms increasingly reorganised both their domestic and international operations after the announcement. Domestic reorganisations may indicate that Chinese firms have, for

example, looked to improve production efficiencies, by increasing their scale economies, to overcome the additional costs implied by the barrier. International reorganisation, however, may signal that Chinese acquirers have also looked to tariff jump, to circumvent the trade barrier.

We conclude, therefore, that the trade barrier was both inefficient and ineffective. Our results suggest that the trade barrier hurt the companies it aimed to protect, while simply encouraging those that it sought to punish to find ways to circumvent it.

4.2. Limitations

All research has its limitations. In our case, two limitations are noteworthy. First, we only consider stock listed firms. We do so because non-stock listed firms do not provide the information necessary for us to complete our analysis. We recognise, however, that stock-listed firms are a specific type of firm, and may not be representative of the industry. Second, we include all stock-listed firms involved in the PV industry, but we do not consider their level of involvement in the industry. We do so for because of data limitation. We recognise, however, that not all firms in the sample may derive all of their revenue from the PV industry, and that there may be within industry variance. We call on future researchers to look for ways to correct for both of these limitations.⁹

5. Conclusions & policy implications

The purpose of the trade barrier, introduced in 2013, was to protect European firms from the alleged dumping of PV products by Chinese manufacturers. We report that while the barrier impacted the industry, it may not have had the impact that the regulators had hoped for. We find that it indiscriminately damaged the industry, and led to a widespread destruction of value. In the aftermath, and as European firms appear to have struggled, we report that Chinese firms reorganised operations, potentially in an effort to circumvent the trade barrier. Our results suggest, therefore, that the trade barrier was both inefficient and ineffective, in that it both hurt the companies it aimed to protect, while those it sought to punish may simply have circumvented it. We would call for European regulators, therefore, to look for alternatives to the trade barrier policy.

⁹ We would like to thank an *anonymous* referee for pointing out these limitations.

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